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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/609,400

07/01/2003

Chang Nam Kim

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EXAMINER

LUND, JEFFRIE ROBERT

ART UNIT

PAPER NUMBER

1763

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

01/05/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/609,400

Applicant(s)

KIM, CHANG NAM

Examiner

Jeffrie R. Lund

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 October 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-3, and 5-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Magdo et al, US Patent 4,256,532.

Magdo et al teaches a mask for depositing a material on a substrate having a first substrate 22 with a plurality of first via holes 14, which define deposition areas on the substrate, and a thickness of 1-5 μ m; and a second substrate 11 with a plurality of via holes 13 and thickness of 125-375 μ m. The via holes are rectangular and overlap each other. The second via holes are larger than the first via holes. A bridge is formed on the first substrate between adjacent first via holes and across the second via hole. Figures 5, 6A, and 6B clearly show the first via holes defining deposition areas on the substrate 53, 60 on which material 58, 68 is deposited. (Entire document, specifically, Figure 1, 1A, 5, 6A, and 6B) The specific substrate (i.e. a flat display) on which the material is deposited is an intended use of the mask. The mask of Magdo et al is capable of depositing a material on a flat display.

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3. Claims 1-3, 5, 6, 10-12, 14, 15, and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Bohlen et al, US Patent 4,417,946.

Bohlen et al teaches a mask having a first substrate 5, 6, or 16 with a plurality of first via holes 11 and a thickness of $1.9\mu\text{m}$; a second substrate 3 with a plurality of via holes 14 and thickness of $1-4\mu\text{m}$ (about $5\mu\text{m}$); a third substrate 12 with a plurality of via holes 15. The via holes are polygons and overlap each other. The third via holes are larger than the second via holes, and the second via holes are larger than the first via holes. (Entire document, specifically, Figure 1) Defining deposition areas on the flat display on which source material is to be deposited and the specific substrate (i.e. a flat display) on which the material is deposited are an intended use of the mask. The mask of Bohlen et al is capable of depositing a material on a flat display.

4. Claims 1-3, 5, and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Sakamoto et al, US Patent 5,234,781.

Sakamoto et al teaches a mask having a first substrate 33 with a plurality of first via holes 34 and a thickness of $2-20\mu\text{m}$; and a second substrate 31 with a plurality of via holes 35 and thickness of $500\mu\text{m}$ of via holes 165. The via holes are polygons and overlap each other. The second via holes are larger than the first via holes. (Entire document, specifically, Figure 5) Defining deposition areas on the flat display on which source material is to be deposited and the specific substrate (i.e. a flat display) on which the material is deposited are an intended use of the mask. The mask of Sakamoto et al et al is capable of depositing a material on a flat display.

5. Claims 10, 14, and 15 are rejected under 35 U.S.C. 102(b) as being anticipated

by Sakamoto et al, US Patent 5,234,781.

Sakamoto et al teaches mask having a first substrate 33 with a plurality of first via holes 34; a second substrate 32 with a plurality of via holes; a third substrate 31 with a plurality of via holes 35. The via holes are polygons and overlap each other. The third via holes are larger than the second via holes, and the second via holes are larger than the first via holes. A bridge is formed on the first substrate between adjacent first via holes and across the second via hole. (Entire document, specifically, Figure 5) Defining deposition areas on the flat display on which source material is to be deposited and the specific substrate (i.e. a flat display) on which the material is deposited are an intended use of the mask. The mask of Sakamoto et al is capable of depositing a material on a flat display.

6. Claims 1-6, 10-15, and 22 are rejected under 35 U.S.C. 102(e) as being anticipated by Yoshizawa et al, US Patent 6,916,582 B2.

Yoshizawa et al teaches a mask having a first substrate 42 with a plurality of first via holes 43 and a thickness of $0.1\mu\text{m}$ (about $1\mu\text{m}$); a second substrate 45 with a plurality of via holes 44 and thickness of $10.1\mu\text{m}$; a third substrate 47 with a plurality of via holes 46. The via holes are polygons and overlap each other. The third via holes are larger than the second via holes, and the second via holes are larger than the first via holes. The via holes have a difference in width ($W_2 - W_1$) of less than $1000\mu\text{m}$. (Entire document, specifically, Figure 4) Defining deposition areas on the flat display on which source material is to be deposited and the specific substrate (i.e. a flat display) on which the material is deposited are an intended use of the mask. The mask of Yoshizawa et al

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is capable of depositing a material on a flat display.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 4, and 10-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Magdo et al, US Patent 4,256,532, in view of Yoshizawa et al, US Patent 6,916,582 B2.

Magdo et al was discussed above.

Magdo et al differs from the present invention in that Magdo does not teach a third substrate, the specific size of the vias, or the thickness of the third substrate.

Yoshizawa et al was discussed above and teaches a mask having three substrates with overlapping via holes.

The motivation for adding a third substrate with overlapping via holes is to increase the mechanical strength of the mask, and to improve the uniformity of the layer deposited through the mask.

The motivation to optimize the size of the vias is to form the desired patterns of the desired size on the substrate. The motivation to optimize the thickness of the third substrate is to provide the required additional strength and provide the desired additional masking to optimize the mechanical strength of the mask and optimize the uniformity of the layer deposited through the mask. Furthermore, it was held in *Gardner*

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v. TEC Systems, Inc., 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984), by the Federal Circuit that, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device. (Also see MPEP 2144.04 (d)) The vias and third substrate of Magdo et al and Yoshizawa et al, sized to that of the claimed invention, would be identical to the mask of the claimed invention.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to add the third substrate of Yoshizawa et al to the mask of Magdo et al, and optimize the size of the vias and the third substrate.

9. Claims 7-9, and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshizawa et al, US Patent 6,916,582 B2, in view of Magdo et al, US Patent 4,256,532.

Yoshizawa et al was discussed above.

Yoshizawa et al differs from the present invention in that Yoshizawa does not teach a bridge adjacent first via holes with a thickness of the second substrate and configured to cross the second via.

Magdo et al was discussed above and includes a bridge adjacent first via holes with a thickness of the second substrate and configured to cross the second via. (See figure 1)

The motivation for adding the bridge Magdo et al to the mask of Yoshizawa et al

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is to strengthen the mask and prevent the apertures from distorting, as taught by Magdo et al and is well known in the art.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to add the bridges of Magdo et al to the mask of Yoshizawa et al.

10. Claims 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshizawa et al, US Patent 6,916,582 B2.

Yoshizawa et al was discussed above.

Yoshizawa et al differs from the present invention in that Yoshizawa does not teach that the second substrate 45 is larger than the third substrate 47.

The motivation for making the second substrate larger than the third substrate is to optimize the size of the second and third substrates. Furthermore, it was held in *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984), by the Federal Circuit that, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device. (Also see MPEP 2144.04 (d)) The second and third substrates of Yoshizawa et al, sized to that of the claimed invention, would have the same structure as the claimed invention and would not perform differently.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the size of the second and third substrates of

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Yoshizawa et al.

11. Claims 4, 13, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bohlen et al, US Patent 4,417,946.

Bohlen et al was discussed above.

Bohlen et al differs from the present invention in that Bohlen does not teach a specific width differences of the via holes.

The motivation to optimize the size of the via holes is to form the desired patterns of the desired size on the substrate. Furthermore, it was held in *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984), by the Federal Circuit that, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device. (Also see MPEP 2144.04 (d)) The vias and bridges of Bohlen et al, sized to that of the claimed invention, would be identical to the via and bridges of the claimed invention.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the size of the via holes of Bohlen et al.

12. Claims 7-9, and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bohlen et al, US Patent 4,417,946, in view of Magdo et al, US Patent 4,256,532.

Bohlen et al was discussed above.

Bohlen et al differs from the present invention in that Bohlen does not teach a bridge adjacent first via holes with a thickness of the second substrate and configured to cross the second via.

Magdo et al was discussed above and includes a bridge adjacent first via holes with a thickness of the second substrate and configured to cross the second via. (See figure 1)

The motivation for adding the bridge Magdo et al to the mask of Bohlen et al is to strengthen the mask and prevent the apertures from distorting, as taught by Magdo et al and is well known in the art.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to add the bridges of Magdo et al to the mask of Bohlen et al.

13. Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bohlen et al, US Patent 4,417,946.

Bohlen et al was discussed above.

Bohlen et al differs from the present invention in that Bohlen does not teach that the second substrate 45 is larger than the third substrate 47.

The motivation for making the second substrate larger than the third substrate is to optimize the size of the second and third substrates. Furthermore, it was held in *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984), by the Federal Circuit that, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not

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perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device. (Also see MPEP 2144.04 (d)) The second and third substrates of Bohlen et al, sized to that of the claimed invention, would have the same structure as the claimed invention and would not perform differently.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the size of the second and third substrates of Bohlen et al.

Response to Arguments

14. Applicant's arguments filed September 21, 2006 have been fully considered but they are not persuasive.

In regard to the arguments that Magdo et al, Bohlen et al, Sakamoto et al, and Yoshizawa et al are directed to removing material and do not disclose that the apertures define a deposition area on which source material is deposited, the Examiner agrees. However, the specific use (i.e. masking for etching or masking for deposition) of the mask is an intended use of the apparatus, and it has been held that: claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Danley*, 120 USPQ 528, 531, (CCPQ 1959); "Apparatus claims cover what a device is, not what a device does" (Emphasis in original) *Hewlett-Packard Co. V. Bausch & Lomb Inc.*, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990); and a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus " if the prior art apparatus teaches all the structural limitations of the claim *Ex parte Masham*, 2

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USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). Also see MPEP 2114. Magdo et al, Bohlen et al, Sakamoto et al, and Yoshizawa et al teach the claimed structure and differ only in function. Furthermore, Magdo et al clearly teaches that a mask use to define an area from which material is removed can also be used to define a deposition area on which material can be deposited. (See figures 6A and 6B)

In regard to the arguments directed to Magdo et al, the Examiner disagrees. First, Figures 1, 1A, and 2A-2E clearly show that the mask of Magdo et al is constructed of two substrates each with via holes. The first substrate 10 has a plurality of first vias holes 14, and a second substrate 11 having a larger via hole 13. The second substrate is used as supporting ribs, but the ribs are formed from a substrate and include a via hole 13, and thus read on the claimed invention. Second, figures 2A-2E clearly show that the second substrate is part of the mask. Third, figures 5, 6A, and 6B clearly show the mask of Magdo et al defining deposition areas for depositing materials.

In regard to the argument:

Bohlen discloses a mask used in the fabrication of a semiconductor substrate. The mask includes three metal layers 5, 6 and 16 layered atop a P+ doped layer 3 of a silicon wafer. The metal layers 5, 6, 16 include apertures 11 formed by aligned vertical walls of the metal layers 5, 6, 16. The apertures 11 of the mask (metal layers 5, 6, 16) are aligned with corresponding holes 14 formed in the doped layer 3 of the wafer. Individual corresponding holes in each of the metal layers 5, 6, 16 which form a corresponding aperture 11 is the same size, as illustrated in the cross sections of the finished mask and wafer structure shown in Figure 1. Thus, Bohlen neither discloses nor suggests first and second via holes formed in first and second substrates, wherein each second via hole has a width greater than a width of a corresponding first via hole, as recited in independent claims 1 and 10, let alone that such holes define a deposition area on which source material is deposited, as recited in independent claims 1 and 10.

The Examiner disagrees. First, the rejection treats one of the metal layers 5, 6, or 16 as the first substrate, and the apertures 11 as the first via hole. The open language of the claims does not limit additional layers having vias the same size as the first vias.

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Second, the layers 5, 6, and 16 are on the second substrate 3 having via holes 14 which are larger than the apertures 11. Thus, Bohlen et al teaches a first substrate with a first via and a second substrate with a second via larger than the first via.

In regard to the argument:

It appears the Office Action has drawn a comparison between the first, second and third metal layers 5, 6, 16 which form the mask disclosed by Bohlen and the first substrate recited in independent claims 1 and 10, and the doped layer 3 of the silicon wafer disclosed by Bohlen and the second substrate recited in independent claims 1 and 10. However, it is respectfully submitted that the comparison of the doped layer 3 to the recited second substrate is improper. That is, Bohlen clearly discloses that the mask is formed by the metal layers 5, 6, 16, and then placed onto the doped layer 3 of the wafer, so as to mask the wafer. Thus, it is improper to consider a portion of the wafer itself, which is the surface to be masked, to also be part of the mask.

The examiner disagrees. The Applicant has correctly summarized the basis for the rejection. The Applicant further argues that "Bohlen clearly discloses that the mask is formed by the metal layers 5, 6, 16, and then placed onto the doped layer 3 of the wafer, so as to mask the wafer." and "Thus, it is improper to consider a portion of the wafer itself, which is the surface to be masked, to also be part of the mask." The Examiner does not believe that this argument is supported in Bohlen et al for the following reasons:

- a) First, the Applicant has not cited where this is taught in Bohlen et al; and
- b) Second, Bohlen et al clearly teaches that figures 2A-2I are steps in making the mask (column 4 lines 38-41). In figure 2A the third substrate 1 (from which ribs 12 are formed) is shown; in figure 2B the second substrate is shown on the third substrate; in figure 2D the first substrate 5 or 6 is shown on the second substrate; figure 2G shows the first vias formed in the first substrate; and figure 2H shows the second vias formed in the second substrate. (Column 7 line 10 through column 10 line 15)
- c) Third, Bohlen et al does not show the mask (shown in figure 1) on substrate.

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Therefore, the conclusion "Thus, it is improper to consider a portion of the wafer itself, which is the surface to be masked, to also be part of the mask." is incorrect.

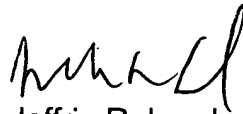
The arguments directed to the use of Sakamoto et al and Yoshizawa et al were discussed above.

Conclusion

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrie R. Lund whose telephone number is (571) 272-1437. The examiner can normally be reached on Monday-Thursday (6:30 am-6:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Jeffrie R. Lund
Primary Examiner
Art Unit 1763

JRL
12/29/06